

WHAT IS CLAIMED IS:

1. A bias circuit for improving linearity of a radio frequency (RF) power amplifier, the RF power amplifier including an RF transistor and a first capacitor, the RF transistor having a collector, an emitter, and a base, the first capacitor having a terminal connected to the base of the RF transistor and another terminal for receiving an RF input signal, the bias circuit comprising:

a bias transistor having a collector, an emitter, and a base, the collector being connected to a DC voltage source and the base being connected to a bias voltage source;

a second capacitor having a first terminal and a second terminal, the first terminal being connected to the emitter of the bias transistor; and

a first inductor having a third terminal and a fourth terminal, the third terminal being connected to the second terminal of the second capacitor and the fourth terminal being connected to a ground;

wherein the second capacitor and the first inductor construct a first LC series-connected resonator circuit for directly conducting part of the RF input signal coupled to the bias transistor into the ground, thereby improving linearity of the RF power amplifier.

2. The bias circuit according to claim 1, further comprising:

a second inductor connected between the base of the RF transistor and the emitter of the bias transistor for blocking part of the RF input signal coupled to the bias transistor.

3. The bias circuit according to claim 1, wherein the first LC series-connected resonator circuit is designed to have a resonant frequency equal to a frequency of a second harmonic component of the RF input signal.

4. The bias circuit according to claim 1, further comprising:

a third capacitor having a fifth terminal and a sixth terminal, the fifth terminal being connected to the base of the bias transistor; and

a third inductor having a seventh terminal and an eighth terminal, the seventh terminal being connected to the sixth terminal of the third capacitor and the eighth terminal being
5 connected to a ground;

wherein the third capacitor and the third inductor construct a second LC series-connected resonator circuit for directly conducting part of the RF input signal coupled to the bias transistor into the ground, thereby improving linearity of the RF power amplifier.

10 5. The bias circuit according to claim 4, wherein the second LC series-connected resonator circuit is designed to have a resonant frequency equal to a frequency of a second harmonic component of the RF input signal.

6. The bias circuit according to claim 1, wherein the bias voltage source comprises:

15 a resistor connected between a supply voltage and the base of the bias transistor; and
a plurality of diodes connected in series between the base of the bias transistor and ground for providing a predetermined voltage to the base of the bias transistor.

7. The bias circuit according to claim 6, wherein each of the plurality of diodes is formed by a
20 transistor having a configuration that a base thereof is connected to a collector thereof.

8. A bias circuit for improving linearity of a radio frequency (RF) power amplifier, the RF power amplifier including an RF transistor and a first capacitor, the RF transistor having a collector, an emitter, and a base, the first capacitor having a terminal connected to the base of
25 the RF transistor and another terminal for receiving an RF input signal, the bias circuit comprising:

a bias transistor having a collector, an emitter, and a base, the collector being connected to a DC voltage source and the base being connected to a bias voltage source;

a second capacitor having a first terminal and a second terminal, the first terminal being connected to the base of the bias transistor; and

5 a first inductor having a third terminal and a fourth terminal, the third terminal being connected to the second terminal of the second capacitor and the fourth terminal being connected to a ground;

wherein the second capacitor and the first inductor construct an LC series-connected resonator circuit for directly conducting part of the RF input signal coupled to the bias
10 transistor into the ground, thereby improving linearity of the RF power amplifier.

9. The bias circuit according to claim 8, further comprising:

a second inductor connected between the base of the RF transistor and the emitter of the bias transistor for blocking part of the RF input signal coupled to the bias transistor.

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10. The bias circuit according to claim 8, wherein the LC series-connected resonator circuit is designed to have a resonant frequency equal to a frequency of a second harmonic component of the RF input signal.

20 11. The bias circuit according to claim 8, wherein the bias voltage source comprises:

a resistor connected between a supply voltage and the base of the bias transistor; and

a plurality of diodes connected in series between the base of the bias transistor and ground for providing a predetermined voltage to the base of the bias transistor.

25 12. The bias circuit according to claim 11, wherein each of the plurality of diodes is formed by a transistor having a configuration that a base thereof is connected to a collector thereof.